

Appln No. 10/716,812  
Amdt date July 27, 2007  
Reply to Office action of April 27, 2007

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Please amend claims 2-5, 7, 8, 16, 17 and 30-32 and cancel claims 1, 11, 12, 23, 25 and 26.

1. (Canceled).
2. (Currently Amended) The electrolyte for a lithium secondary battery according to claim [[1]] 13, wherein the ester-based or ether-based organic solvent is used in an amount of 30 to 95 vol%.
3. (Currently Amended) The electrolyte for a lithium secondary battery according to claim [[1]] 13, wherein the ~~non-aqueous organic solvent is an~~ ester-based organic solvent is selected from the group consisting of  $\gamma$ -butyrolactone ( $\gamma$ -BL), n-methyl acetate, n-ethyl acetate, and n-propyl acetate.
4. (Currently Amended) The electrolyte for a lithium secondary battery according to claim [[1]] 13, wherein the ether-based organic solvent is dibutyl ether.
5. (Currently Amended) The electrolyte for a lithium secondary battery according to claim [[1]] 13, wherein the non-aqueous organic solvent further comprises a solvent selected from the group consisting of carbonate-based solvents, and mixtures of carbonate-based solvents and aromatic hydrocarbon organic solvents.
6. (Previously Presented) The electrolyte for a lithium secondary battery according to claim 5, wherein the carbonate-based solvent is selected from the group consisting

of dimethyl carbonate (DMC), diethyl carbonate (DEC), methylpropyl carbonate (MPC), ethylpropyl carbonate (EPC), methylethyl carbonate (MEC), ethylene carbonate (EC), propylene carbonate (PC), butylene carbonate (BC), and mixtures thereof.

7. (Currently Amended) The electrolyte for a lithium secondary battery according to claim 5, wherein the non-aqueous organic solvent comprises an aromatic hydrocarbon organic solvent, wherein the aromatic hydrocarbon organic solvent is represented by Formula (1):



(1)

wherein R is selected from the group consisting of halogens and  $C_1$  to  $C_{10}$  alkyls, and n is an integer ranging from 0 to 6.

8. (Currently Amended) The electrolyte for a lithium secondary battery according to claim [[1]] 13, wherein the one or more lithium salts are selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiSbF_6$ ,  $LiAsF_6$ ,  $LiClO_4$ ,  $LiCF_3SO_3$ ,  $Li(CF_3SO_2)_2N$ ,  $LiC_4F_9SO_3$ ,  $LiSbF_6$ ,  $LiAlO_4$ ,  $LiAlCl_4$ ,  $LiN(C_xF_{2x+1}SO_2)(C_yF_{2y+1}SO_2)$ , where x and y are natural numbers,  $LiCl$ , and  $LiI$ .

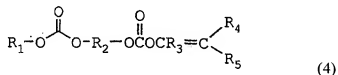
9. (Original) The electrolyte for a lithium secondary battery according to claim 8, wherein the one or more lithium salts are present in a concentration ranging from 0.6 to 2.0 M.

10. (Canceled).

11. (Canceled).

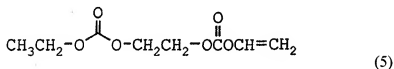
12. (Canceled).

13. (Previously Presented) An electrolyte for a lithium secondary battery, comprising a non-aqueous organic solvent including 20 to 95 vol% of an ester-based or ether-based organic solvent based on a total amount of organic solvent; one or more lithium salts; and an additive compound having at least two carbonate groups, wherein the additive compound is a carbonic acid ester compound of the following Formula (4):

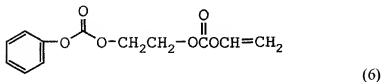


wherein R<sub>1</sub> is hydrogen, a C<sub>1</sub> to C<sub>6</sub> alkyl, or a C<sub>6</sub> to C<sub>12</sub> aryl; R<sub>2</sub> is (CH<sub>2</sub>)<sub>n</sub>, where n is an integer of 1 to 6; R<sub>3</sub> is hydrogen, a C<sub>1</sub> to C<sub>6</sub> alkyl, or a C<sub>6</sub> to C<sub>12</sub> aryl; and R<sub>4</sub> and R<sub>5</sub> are each independently hydrogen or a C<sub>1</sub> to C<sub>6</sub> alkyl.

14. (Previously Presented) The electrolyte for a lithium secondary battery according to claim 13, wherein the additive compound is selected from the group consisting of a compound of Formula (5):



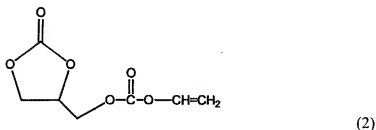
a compound of Formula (6):



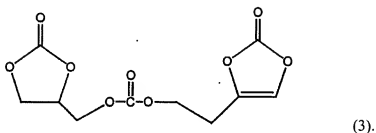
and a mixture thereof.

15. (Previously Presented) An electrolyte for a lithium secondary battery,

comprising a non-aqueous organic solvent including 20 to 95 vol% of an ester-based or ether-based organic solvent based on total amount of organic solvent; one or more lithium salts; and an additive compound represented by the following Formula (2):



or Formula (3):



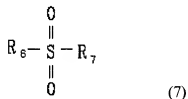
16. (Currently Amended) The electrolyte for a lithium secondary battery according to claim [[1]] 13, wherein the additive compound is present in an amount of 0.1 to 10 wt% based on the total amount of the electrolyte.

17. (Currently Amended) The electrolyte for a lithium secondary battery according to claim [[1]] 13, wherein the electrolyte further comprises a secondary additive compound selected from the group consisting of vinylene carbonates, organic sulfone-based compounds, and mixtures thereof.

18. (Previously Presented) The electrolyte for a lithium secondary battery according to claim 17, wherein the secondary additive comprises a vinylene carbonate present in an amount of 0.1 to 50 wt% based on the total amount of the electrolyte.

19. (Previously Presented) The electrolyte for a lithium secondary battery according to claim 17, wherein the secondary additive comprises a organic sulfone-based compound present in an amount of 0.1 to 5 wt% based on the total amount of the electrolyte.

20. (Original) The electrolyte for a lithium secondary battery according to claim 17, wherein the secondary additive compound is an organic sulfone-based compound represented by the following Formula (7):



wherein R<sub>6</sub> and R<sub>7</sub> are each independently selected from the group consisting of primary, secondary, and tertiary alkyl groups, alkenyl groups, aryl groups, and cycloalkyl groups.

21. (Original) The electrolyte for a lithium secondary battery according to claim 20, wherein one of R<sub>6</sub> and R<sub>7</sub> is an alkenyl.

22. (Previously Presented) The electrolyte for a lithium secondary battery according to claim 17, wherein the secondary additive compound is vinyl sulfone.

23. (Canceled).

24. (Canceled).

25. (Canceled).

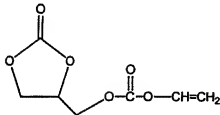
26. (Canceled).

27. (Previously Presented) A lithium secondary battery comprising a positive electrode comprising a material that is capable of reversible intercalation/deintercalation of lithium ions;

a negative electrode comprising a negative active material selected from the group consisting of lithium metal, lithium-containing alloys, materials capable of reversible intercalation/deintercalation of lithium ions, and materials capable of reversibly forming lithium-containing compounds;

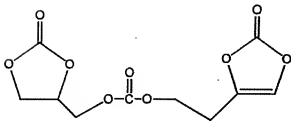
a separator interposed between the positive and negative electrodes; and

an electrolyte comprising a non-aqueous organic solvent including 20 to 95 vol% of an ester-based or ether-based organic solvent based on the total amount of organic solvent; one or more lithium salts; and an additive compound having at least two carbonate groups, wherein the additive compound is represented by Formula (2):



(2), and

compounds represented by Formula (3):



(3).

28. (Previously Presented) A lithium secondary battery comprising:

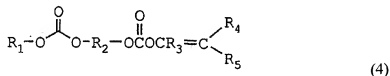
a positive electrode comprising a material that is capable of reversible

intercalation/deintercalation of lithium ions;

a negative electrode comprising a negative active material selected from the group consisting of lithium metal, lithium-containing alloys, materials capable of reversible intercalation/deintercalation of lithium ions, and materials capable of reversibly forming lithium-containing compounds;

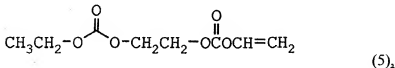
a separator interposed between the positive and negative electrodes; and

an electrolyte comprising a non-aqueous organic solvent including 20 to 95 vol% of an ester-based or ether-based organic solvent based on the total amount of organic solvent; one or more lithium salts; and an additive compound of the following Formula (4):

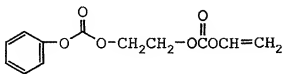


wherein R<sub>1</sub> is selected from the group consisting of hydrogen, C<sub>1</sub> to C<sub>6</sub> alkyls, and C<sub>6</sub> to C<sub>12</sub> aryls; R<sub>2</sub> is (CH<sub>2</sub>)<sub>n</sub>, where n is an integer ranging from 1 to 6; R<sub>3</sub> is selected from the group consisting of hydrogen, C<sub>1</sub> to C<sub>6</sub> alkyls, and C<sub>6</sub> to C<sub>12</sub> aryls; and R<sub>4</sub> and R<sub>5</sub> are each independently selected from the group consisting of hydrogen and C<sub>1</sub> to C<sub>6</sub> alkyls.

29. (Previously Presented) The lithium secondary battery according to claim 28, wherein the additive compound is selected from the group consisting of compounds represented by Formula (5):



compounds represented by Formula (6):



(6)

and mixtures thereof.

30. (Currently Amended) The lithium secondary battery according to claim [[23]] 28, wherein the additive compound is present in an amount of 0.1 to 10 wt% based on the total amount of the electrolyte.

31. (Currently Amended) The lithium secondary battery according to claim [[23]] 28, wherein the electrolyte further comprises a secondary additive compound selected from the group consisting of vinylene carbonates, organic sulfone-based compounds, and mixtures thereof.

32. (Currently Amended) The lithium secondary battery according to claim [[23]] 28, wherein the positive active material is a lithium-nickel-based or a lithium-nickel-manganese-based compound.